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Y Series Stirred Baths and Circulators

VF Immersion Thermostats

Refrigerated Immersion Coolers

User Manual

User Manual for Y Series Stirred Baths

Product	Description
Y6-VF	Y6 (6 liter bath tank) + VF Stirrer/Controller
Y6-VFP	Y6 (6 liter bath tank) + VFP Stirrer/Controller with Pump
Y14-VF	Y14 (14 liter bath tank) + VF Stirrer/Controller
Y14-VFP	Y14 (14 liter bath tank) + VFP Stirrer/Controller with Pump
Y22-VF	Y22 (22 liter bath tank) + VF Stirrer/Controller
Y22-VFP	Y22 (22 liter bath tank) + VFP Stirrer/Controller with Pump
Y28-VF	Y28 (28 liter bath tank) + VF Stirrer/Controller
Y28-VFP	Y28 (28 liter bath tank) + VFP Stirrer/Controller with Pump
Y38-VF	Y38 (38 liter bath tank) + VF Stirrer/Controller
Y38-VFP	Y38 (38 liter bath tank) + VFP Stirrer/Controller with Pump
VFK	Value Immersion Thermostat
VFKP	Value Immersion Thermostat with Pump
C1G/IC-200	Refrigerated Immersion Coolers
C2G/IC-400	Refrigerated Immersion Coolers

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1. SAFETY

This equipment has been designed and constructed to comply with the electrical safety requirements of IEC 1010-1 (safety requirements for electrical equipment for measurement, control and laboratory use), and IEC-1010-2-010 (specification for laboratory equipment for the heating of materials). These International Standards are also published as European (EN 61010) and British (BS EN 61010) standards.

- Always obey the following safety precautions:

CAUTION: Read this documentation fully before use and pay particular attention to sections containing this symbol:

- CAUTION: Some surfaces can become HOT during high temperature operation.
- DO NOT CONNECT TO THE POWER SUPPLY OR SWITCH ON BEFORE FILLING THE TANK.
- Only connect to a power supply with a voltage corresponding to that on the serial number label.
- Connect the control unit only to a power supply which provides a safety ground terminal. Connecting to an ungrounded power supply is potentially dangerous.

Before moving, drain the bath and disconnect the power supply at the power supply socket. Do NOT remove the IEC connector from the rear of the unit.

- Ensure that the unit is positioned such that the power switch is easily accessible during use.
- The ventilation slots on the rear of the unit must not be blocked or restricted.
- Take care when topping off or draining, as the liquid in the tank may be hot.

If the **alarm lamp** is illuminated take care as the liquid may be at boiling point. DO NOT TOUCH the heater as it may be VERY hot. When refilling the bath be very careful. The heater may be hot and, when cold water comes into contact with it, the water can boil violently throwing off very hot droplets of water and scalding steam. USE SAFETY GLASSES.

- If the alarm lamp is illuminated and the heater is not immersed in liquid, DO NOT TOUCH IT - it will be very HOT. Do not place the control unit on a surface which is flammable.

- Do not check the liquid temperature by touch. Use the temperature display or an accessory thermometer.

Use only water or water/glycol mix. Do not use these liquids outside the specified temperature range. If the alarm lamp is illuminated and water/glycol mixture is being used, the temperature of the liquid may be above its recommended maximum temperature. DO NOT inhale the vapors given off from the hot liquids as they are TOXIC. If water/glycol mixture is heated above its recommended maximum, discard safely and replace with new liquid.

- Always use a lid or polypropylene spheres when operating above 60 ˚C. Take care when raising and removing the lid. The lid may be hot. Steam and hot vapors can cause scalding

- When working at high temperatures (greater than 60 ˚C), reduce the risk of eye injury by using safety goggles or spectacles.

- Before draining allow the liquid to cool to below 50 ˚C. Drain using a hand siphon pump (SYI).

- When pumping through or around external apparatus, always use connecting pipe or hose suitable for the operating temperature and liquid used, and check that the pipe connections are secure before switching on.

- Do not disconnect any pipes or hoses while they contain hot liquid.

- The bath should be used in a manner specified by this user manual, otherwise the protection provided by the equipment may be impaired.

- It is the user's responsibility to carry out any appropriate decontamination if hazardous material is spilled on or inside the equipment.

2. GETTING STARTED

2.1 Unpacking

Remove the packing materials carefully, and retain for future shipment or storage of the unit. Packs should contain:

2.1.1 Bath control units

2.1.1.1 VF Stirrer/Controller

Power line cord
Operating instructions

2.1.1.2 VFP Stirrer/Controller with Integral Pump

250 mm length of tube
Bag containing:
- 1 large pipe connector with nut
- 1 small pipe connector
- 1 small pipe connector with nut
- 1 fiber washer

Power line cord
Operating instructions

2.1.2 Immersion thermostats

2.1.2.1 VFK Immersion Thermostat

K clamp
Power line cord
Operating instructions

2.1.2.2 VFKP Immersion Thermostat with Integral Pump

K clamp
250 mm length of tube
Bag containing:
- 1 large pipe connector with nut
- 1 small pipe connector
- 1 small pipe connector with nut
- 1 fiber washer

Power line cord
Operating instructions

2.1.3 Bath Tanks

Y6 through Y38, each fitted with bridge plate

2.1.4 Refrigerated Immersion coolers

C1G/IC-200 or C2G/IC-400

2.2 Installation

2.2.1 Y6-VF through Y38-VF Stirred Baths (without integral pump)

Remove the bridge plate from the tank by unscrewing the waisted nuts underneath the bridge plate. Remove the four screws from the underside of the control unit (see figure 1). Feed the heater through the hole in the bridge plate, being careful not to force it.

Position the control unit such that it faces either along the bridge plate or over the bath working area according to preference. Attach the bridge plate to the control unit with three of the screws (see figures 2a and 2b). The fourth screw is a spare.

Replace the bridge plate on the tank, ensuring that the studs fit into the brackets. Tighten the nuts. Plug the power line cord into the socket on the rear of the unit.

2.2.2 Y6-VFP through Y38-VFP Stirred Baths with integral pump for external circulation

Remove the bridge plate from the tank by unscrewing the waisted nuts underneath the bridge plate.

Remove the four screws (see figure 1) from the underside of the control unit.

Feed the heater and pump through the hole in the bridge plate, being careful not to force it. Position the control unit so that it faces over the bath working area.

Note: The VFP unit can only be fitted in the one direction, unlike the VF.

Attach the control unit to the bridge plate with three of the screws (see figure 2b). The fourth screw is a spare.

Excellent circulation within the tank is achieved by means of the stirrer. The pump is required for circulation to external apparatus only.

To use the pump:

Remove the large grommet from the bridge plate and fit the large connector supplied, with the nut underneath (see figure 3).

Screw the small pipe connector into the lower part of the large connector with the fiber washer between the two.

Fit a 250 mm length of 10 mm bore tube between the pump output and the lower pipe connector, making sure that the tube is not pinched.

Remove the small grommet and fit the remaining pipe connector, with the nut underneath.

Replace the bridge plate on the tank, ensuring that the studs fit into the brackets.

Attach the pipe which feeds the external circuit to the large pipe connector. Fit the return pipe to the other pipe connector.

WARNING: Ensure that the tubing is securely clamped to the connectors and to the external circuit, and that the tubing is suitable for the liquid temperature.

If external circulation is not required, fit a short length of pipe between the two connectors, ensuring that it is not pinched

Plug the power line cord into the socket on the rear of the control unit.

The pump is designed for circulation around a closed circuit, which is one not open to the atmosphere. It cannot be used for circulation through an external open tank.

2.2.3 VFK Immersion Thermostat

For use with rectangular or circular vessels. Maximum wall width 20 mm.

Remove the four screws from the underside of the control unit (see figure 1).

Attach the K clamp to the base of unit using three of the screws (see figure 4). The fourth screw is a spare.

Clamp the control unit to the side of the vessel, taking care not to over-tighten the clamp, especially if the vessel is fragile.

Plug the power line cord into the socket on the rear of control unit.

WARNING: When using the immersion thermostat above 60 ˚C, use a lid which fits tightly around the controller or polypropylene spheres. The purpose of the lid is to prevent vapors from the hot liquid escaping into the atmosphere or being drawn into the controller with the cooling air. Hot vapors should not be inhaled. The lid also improves the heat up rate and reduces liquid evaporation.

2.2.4 VFKP Immersion Thermostat with Pump for external circulation

For use with rectangular or circular vessels, maximum wall width 20 mm.

Remove the four screws from the underside of the control unit (see figure 1).

Attach the K clamp to the base of the control unit using three of the screws (see figure 3). The fourth screw is a spare.

Fit a sufficient length of 10 mm bore tubing to the pump output; attach the other end to the external circuit. Feed the return pipe back into bath and secure it so that it cannot escape from the bath.

WARNING: Ensure that the tubing is securely clamped to the connectors and to the external circuit, and that the tubing is suitable for the liquid temperature.

If external circulation is not required ensure that the bung supplied is fitted into the pump outlet to prevent splashing.

Clamp the control unit to the side of the vessel, taking care not to over-tighten the clamp, especially if the vessel is fragile.

Plug the power line cord into the socket on the rear of the control unit.

The pump is designed for circulation around a closed circuit, which is one not open to the atmosphere. It cannot be used for circulation through an external open tank.

WARNING: When using the immersion thermostat above 60 ˚C, use a lid which fits tightly around the controller, or polypropylene spheres. The purpose of the lid is to prevent vapors from the hot liquid escaping into the atmosphere or being drawn into the controller

with the cooling air. Hot vapors should not be inhaled. The lid also improves the heat up rate and reduces liquid evaporation.

2.2.5 Near or below ambient operation

Y-VF and Y-VFP series baths without lids can be used to within 5 ˚C of ambient without accessory cooling.

Cooling systems: Refrigerated Immersion Cooler C1G/IC-200 or C2G/IC-400, Heat Exchange Coil CW5.

CW5 is suitable for use with a refrigerated circulator or tap water. To use tap water, ensure that local water supply regulations are adhered to. The CW5 coil can be used in any bath with a minimum depth of 150 mm.

C1G/IC-200 is suitable for use with all Y-VF and Y-VFP series baths and with Immersion Thermostats VFK and VFKP in tanks deeper than 150 mm.

C2G/IC-400 is suitable for use only with Y28-VF(P) and Y38-VF(P) baths and with Immersion Thermostats VFK or VFKP in tanks deeper than 200 mm.

Note: It may be necessary to use a lid or polypropylene spheres (see 4.3) to maintain low temperatures. When using baths at lower temperatures, condensation may form as the tanks are not insulated.

2.2.5.1 Cooling systems with Y Series Bath Tanks

Remove the bridge plate from the bath. Remove the small piece which covers the slot in the bridge plate.

Put the cooling coil into the bath and replace the bridge plate such that the slot holds the coil in position.

To keep the slot cover for future use, turn it upside down and fix in position with the screw.

2.2.5.2 Cooling systems with Immersion Thermostats

Position the cooling coil in the tank and clamp it in position, ensuring that it is fully immersed.

2.2.6 Connection to electrical supply

WARNING: The equipment must be grounded. It is protected by internal electrical fuses. We strongly recommend that the power supply to any equipment for heating liquids should include a ground fault interrupter circuit breaker (ground leakage trip).

Check that the voltage rating of the product, given on the serial number plate at the power line cord entry, is correct for your supply

Fit the power line cord into the IEC power socket at the rear of the unit.

3. OPERATION

3.1 Y-VF and Y-VFP series baths and Immersion Thermostats VFK, VFKP

3.1.1 Controls and indicator lamps (see figures 5 & 6)

3.1.1.1 Power switch

Power switch is located on the front panel.

3.1.1.2 Temperature display

The display normally shows the bath liquid temperature in ˚C. When the gray **display set ˚C** button is pressed, the set temperature is shown.

3.1.1.3 Set temperature knob

The **push to set ˚C** knob sets the required operating temperature-

3.1.1.4 Alarm lamp

Alarm lamp (red) illuminates when the overtemperature cut-out has operated.

3.1.1.5 Heater protection cut-out

The cut-out temperature is fixed at approximately 120 ˚C. The cut-out operates if the liquid level falls below the bottom of the heater so that the temperature sensing probe is no longer immersed in the liquid. This causes the heater to raise in temperature to above the operating point of the cutout. When it has operated, the red alarm lamp illuminates and the

heater and stirrer are switched off. The liquid temperature continues to be displayed to warn of possible high temperatures.

The reset button is located on the rear of the control unit and is covered by a removable cap. **DO NOT** reset the cut-out before allowing the heater to cool and refilling the bath. To reset it, remove the protective cap and press the reset button. If the cut-out cannot be reset, or the liquid temperature continues to rise above the set temperature after resetting the out-out, have the unit checked by a technician.

3.1.2 Filling

Before filling the bath. disconnect the power supply, NOT by removing the IEC connector from the rear of the unit. When the tank is fully loaded, fill to a maximum level of 10 mm from the top with a liquid suitable for your working temperature.

Specified liquids.-

0 to 30 ˚C	80% water, 20% antifreeze (inhibited ethylene glycol) **WARNING - TOXIC:** Follow the manufacturer's instructions. For safe disposal consult your local Environmental Health Office. Use a lid to reduce the dilution of the mixture caused by condensing water vapor from the air, and to maintain the cool down rate.
5 to 80 ˚C	Water, recommended temperature range. Use a lid or polypropylene spheres above 60 ˚C to reduce evaporation and heat loss.
80 to 99.9 ˚C	Water can be used but care should be taken with its use as hot water vapor can be dangerous. A lid or polypropylene spheres must be used. At these temperatures the temperature control will be reduced due to localized boiling, and there may be a large loss of water due to evaporation. The control units should not be used to boil water.

Both water from a drinking source and de-ionized water is suitable for use in the baths. However, some older de-ionizers can create concentrated salt solutions for a short time after the ionizer is rejuvenated. This solution should not be used in the baths as it may cause corrosion.

3.1.3 Switching on and setting up

Connect the pump to your external circuit if required.

Connect the control unit to a grounded electrical power supply with voltage and frequency within the range specified on the serial number plate.

DO NOT SWITCH **ON** BEFORE FILLING THE TANK.
If the control unit does not come on, check whether the alarm lamp is illuminated, see 3.1.1.5

3.1.4 Setting the temperature

Press the gray **display set ˚C** button to change the display from actual to set temperature; at the same time press the blue **push to set ˚C** knob and turn it to the required operating temperature. When the button is released, the set temperature cannot be altered by turning the knob.

3.2 C1G/IC-200, C2G/IC-400

The power switch is on the rear of the unit. Switch on at the rear. Always ensure that the bath is switched on to provide temperature control, and to prevent the formation of ice. Do not switch on if:

- the temperature of the liquid in the bath is above 40 ˚C
- the cooler has been tilted by more than 25 degrees during the past six hours
- the interval since switching off the cooling system is less than 10 minutes.

Condensed water vapor from the air will dilute water/glycol mixtures and eventually ice will form on the cooling coil. This should be removed and liquid replaced, otherwise cooling power will be reduced.

3.2.1 Use with other tanks

Use a stirrer to prevent ice formation. For temperature control, use a thermostat and heater; do not switch the cooler with a thermostat as this could damage the refrigeration system.

4. ACCESSORIES

4.1 Test tube racks

The following stainless steel test tube racks are available:

Bath Tank	Racks per bath
Y6	1 X QR
Y14	2 X VR
Y22	4 X VR
Y28	4 X VR
Y38	6 X VR

Tube Diameter	Tubes / rack		Catalog Numbers
	QR	VR	
10 -13 mm	30	65	QR-10, VR-10
16-19 mm	16	36	QR-16, VR-16
24 mm	10	23	QR-30, VR-30
30 mm	5	14	QR-30, VR-30
0.5 ml µ tubes	44	102	QR-SE, VR-SE
1.5 ml µ tubes	35	75	QR-LE, VR-LE

4.2 Raised shelves

Raised shelves RS14, RS22, RS28 and RS38 are available for Y14, Y22, Y28 and Y38 tanks respectively. The raised shelves can be used with either end up in the bath to give different immersion depths. The immersion depth can be adjusted by changing the quantity of liquid in the bath.

4.3 Lids

4.3.1 Stainless steel gabled lids LS14, LS28, LS38

LS14 for Y14 bath tank
LS28 for Y22 and Y28 bath tanks
LS38 for Y38 bath tanks

The pack contains:
- Lid
- Handle
- Adapters
- Screws

To assemble: remove the protective film. Pass the two screws through the holes in the lid, thread the adapters on to the screws, so that the “V” cut fits over the ridge of the lid. Hold the handle in position against the adapters and fasten to the lid by tightening the screws.

4.3.2 Polypropylene spheres (PS20)

Polypropylene spheres are an alternative to lids. They minimize evaporation and heat loss, allow easy access to vessels in the bath, and are particularly useful for tall vessels. One package contains approximately 300 spheres.

Bath tank	Y6	Y14	Y22	Y28	Y38
Spheres Required	1 X PS20	1 X PS20	2 X PS20	2 X PS20	3 X PS20

4.4 Siphon SYI

A Siphon (SY1) can be used to drain the bath.

5. FAULT DIAGNOSIS

Symptom	Possible Cause	Action Required
Unit does not operate	Unit not switched on	Switch On
Power lamp off	Unit not plugged into power supply	Plug in, switch on
	Fuse blown in the unit	Check and replace
	Electrical power supply failure	Check that other electrical appliances on the same circuit are working
Alarm light on	Overtemperature cut-out has operated	Reset cut-out as described in 3.1.1.5
Temperature does not rise when expected	Set temperature is lower than liquid temperature	Check set temperature
	Temperature control circuit fault	Have unit checked by technician
Temperature continues to rise when not expected	Set temperature is higher than liquid temperature	Check set temperature
	Set temperature is too close to ambient	Raise the set temperature or add accessory cooling
	Temperature control circuit fault	Have unit checked by technician
Stirrer motor does not rotate	Stirrer or propeller obstructed	Clear obstruction
	Pump obstructed (VFP, VFKP)	Clear obstruction
	If stirrer motor shaft rotates freely, then motor thermal fuse may have blown	Have unit checked by technician

6. TECHNICAL SPECIFICATIONS

This equipment is designed for indoor use in laboratory conditions, with room temperature between 5 ˚C and 40 ˚C, and 80% relative humidity. Performance figures quoted apply to equipment used in ambient temperature between 10 ˚C and 35 ˚C.

6.1 VF, VFP, VFK, VFKP

Temperature range:		0 to 99.9 ˚C
Stability (DIN 58966):	@37 ˚C	± 0.1 ˚C
Uniformity:	@37 ˚C	± 0.2 ˚C
Temperature setting/display:		digital/LED
Display resolution:		0.1 ˚C
Heater power:	@115V	1.0 kW
Overall consumption:	@115V	1.1 kW
Pump, VFP, VFKP:	max. head	1.3 meters
	max. flow	9 L/min
	pipe bore	9 mm
Overtemperature protection	fixed resettable over temperature cut-out	
Supply voltage range	110-120V, 50/60Hz	

Heat up time in minutes from 25 ˚C to 70 ˚C with water and lid on:

Y6-VF(P)	Y14-VF(P)	Y22-VF(P)	Y28-VF(P)	Y38-VF(P)
16	35	53	70	100

6.2 Y-Series Bath Tanks

	Y6	Y14	Y22	Y28	Y38
Tank Capacity (L)	6	14	22	28	38
Tank Dimensions l/w/d (mm)	300/150/150	325/300/150	505/300/150	505/300/200	690/300/200
Liquid depth, min/max (mm)	80/140	70/140	70/140	120/190	120/190

6.3 C1G/IC-200, C2G/IC-400

Refrigerated cooler for use in liquids between -20 ˚C and 40 ˚C.

The cooling coil may be immersed in liquids up to 100 ˚C, but the cooler should not be switched on with liquid temperatures above 40 ˚C.

Immersed material: the cooling coil is nickel-plated copper.

		C1G/IC-200	C2G/IC-400
Cooling power	@20 ˚C	300 W	350 W
	@0 ˚C	100 W	250 W
Overall consumption		200 W	400 W
Dimensions		410/285/225 mm	475/320/255 mm
Flexible pipe length		925 mm	925 mm
Coil diameter/length		77/55 mm	77/105 mm
Electrical supply		110-120 VAC	110-120 VAC or 220-240 VAC

7. MAINTENANCE AND SERVICE

All Science/Electronics laboratory products are designed to comply with IEC1010-1 and can be flash tested. Some are fitted with radio frequency interference suppressors - Therefore it is recommended that only a d.c.. test is performed.

7.1 VF, VFP, VFK, VFKP

No routine maintenance is required.

For service, obtain an RMA number, remove the control unit and return to our service department. DO NOT RETURN THE TANK OR BRIDGE PLATE.

7.2 C1G/IC-200, C2G/IC-400

Dust on the refrigeration condenser: Cooling power will be reduced if the fins behind the front grille become clogged with dust. Examine monthly and, if necessary, call a technician to take off the cover and remove the dust.

No other routine maintenance is required.

Disposal:

This unit contains refrigerant gas, which must NOT be discharged into the atmosphere. At the end of the units working life, either have the gas removed safely by using refrigerant recovery equipment or return the unit to us for disposal.

7.3 Cleaning

The cases can be cleaned with a damp cloth after disconnection. NO SOLVENTS must be used. The immersed parts can be cleaned using a proprietary heating element cleaner. **CAUTION:** TOXIC - follow manufacturer's instructions.

Before using any cleaning or decontamination method except those recommended by the manufacturer, users should check with the manufacturer that the proposed method will not damage the equipment.

7.4 Replacement of fuses

Disconnect the unit from the power supply socket. Remove the IEC power plug from the rear of the unit. Press down the drawer catch (see figure 6). Pull out the fuse drawer, check and replace with the correct fuses if necessary, as follows:

1.25 x 0.25 inch quick acting rated:

VF, VFP, VFK, VFKP:	110-120V - 15AF
C1G/IC-200, C2G/IC-400:	110-120V - 20AF
C2G/IC-400:	220-240V - 10AF

Push back the drawer and replace the IEC plug.

8. WARRANTY

When used in laboratory conditions and according to this user manual, this equipment is warranted for THREE YEARS against faulty materials or workmanship.

9. SERVICE

It is necessary that a Returned Materials Authorization (RMA) number and form be obtained before return of any Science/Electronics product for any reason. Contact us for more information. Please be sure to mark the outside of the returned goods package with this RMA number to ensure prompt handling.

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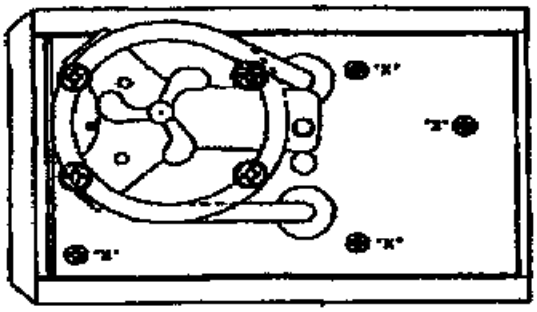

Figure 1

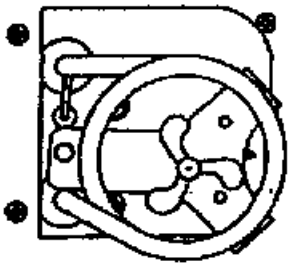

Figure 2a

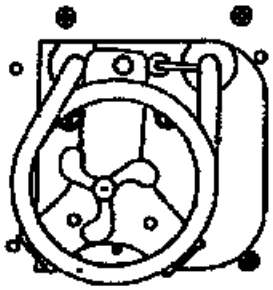

Figure 2b

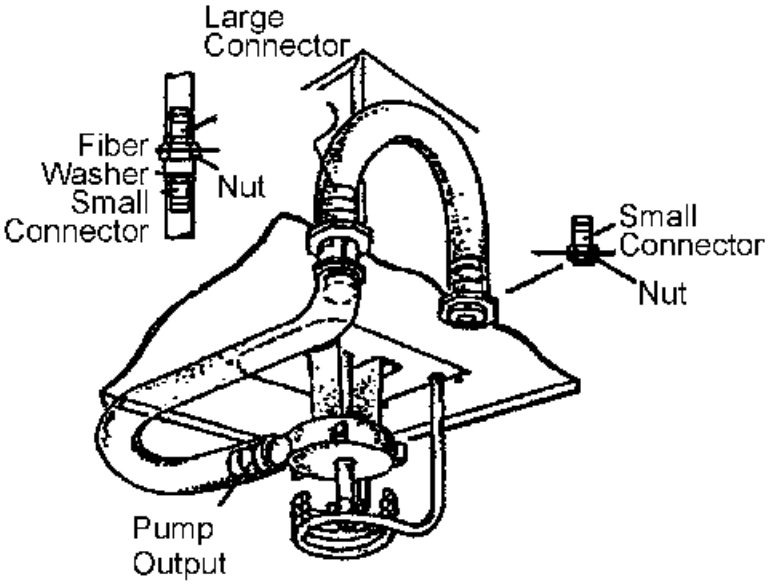

Figure 3

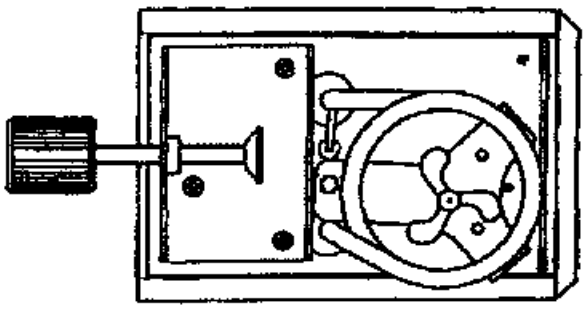

Figure 4

Identification of units and controls
(Front)

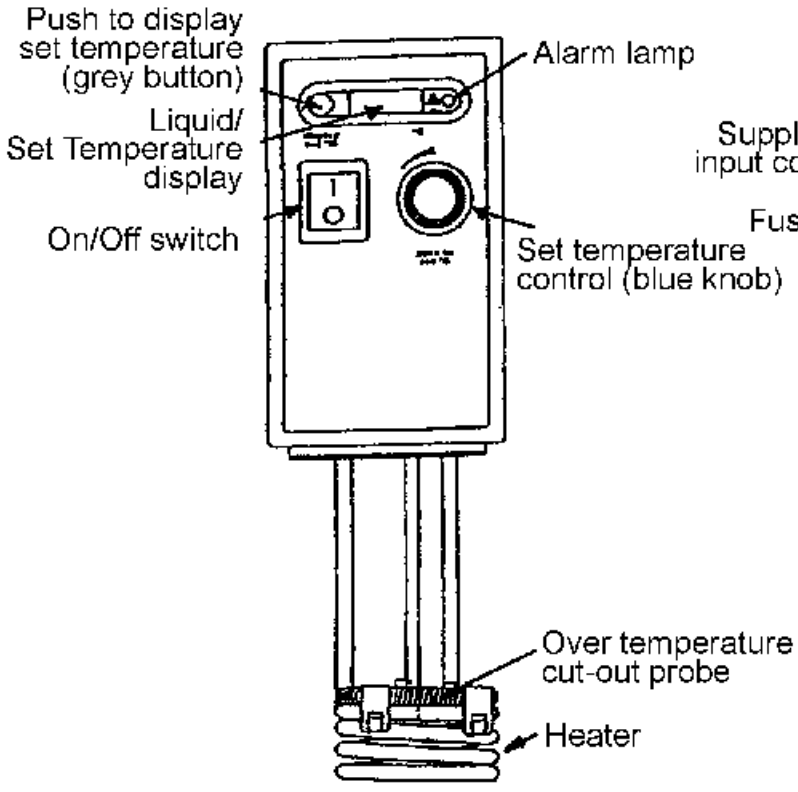

Figure 5

Identification of units and controls
(Rear)

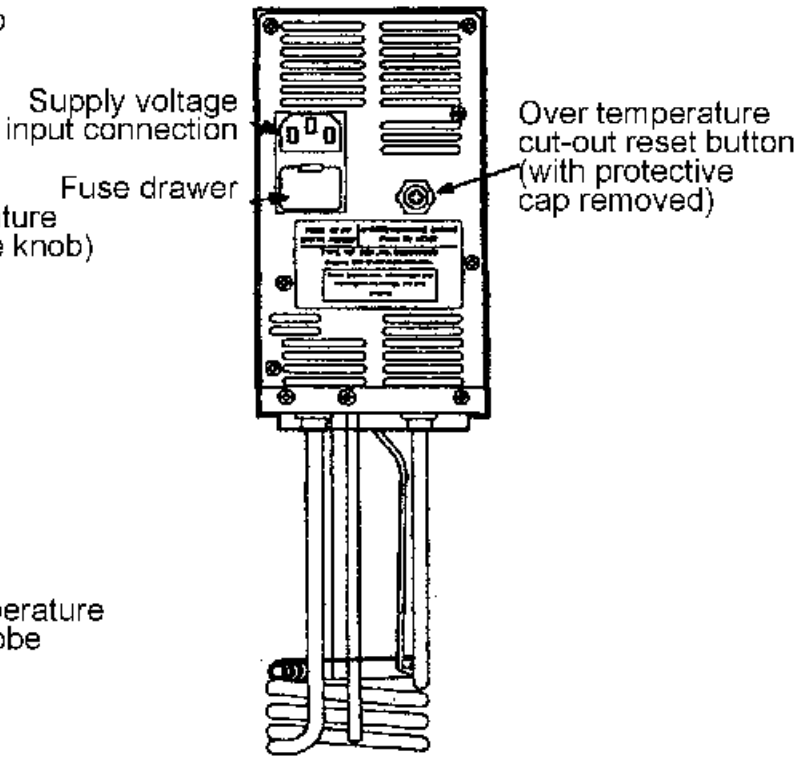

Figure 6